

Name: \_\_\_\_\_  
PC: Quadratic Functions

Date: \_\_\_\_\_

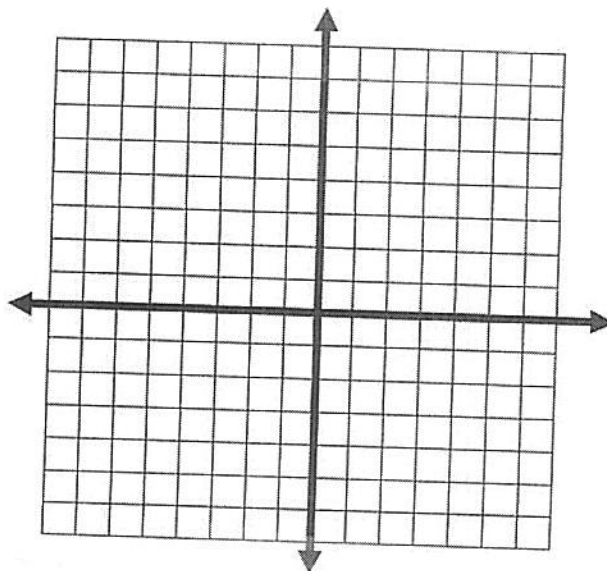
**Standard form:**  $y = f(x) = ax^2 + bx + c$ ,  $a \neq 0$

- If  $a > 0$ , then the parabola opens upward; if  $a < 0$ , then the parabola opens downward.
- The vertex of the parabola is the point  $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$ , and the axis of symmetry is  $x = \frac{-b}{2a}$ .
- To find the y-intercept, let  $x = 0$  and solve for  $y$ .
- To find the x-intercept, let  $y = 0$  and solve for  $x$ . (This will result in a quadratic equation which might have 0, 1 or 2 solutions.)

**Vertex form:**  $y = f(x) = a(x-h)^2 + k$ ,  $a \neq 0$

- If  $a > 0$ , then the parabola opens upward; if  $a < 0$ , then the parabola opens downward.
- The vertex of the parabola is the point  $(h, k)$  and  $x = h$  is the axis of symmetry.
- To find the y-intercept, let  $x = 0$  and solve for  $y$ .
- To find the x-intercept, let  $y = 0$  and solve for  $x$ . (This will result in a quadratic equation which might have 0, 1 or 2 solutions.)

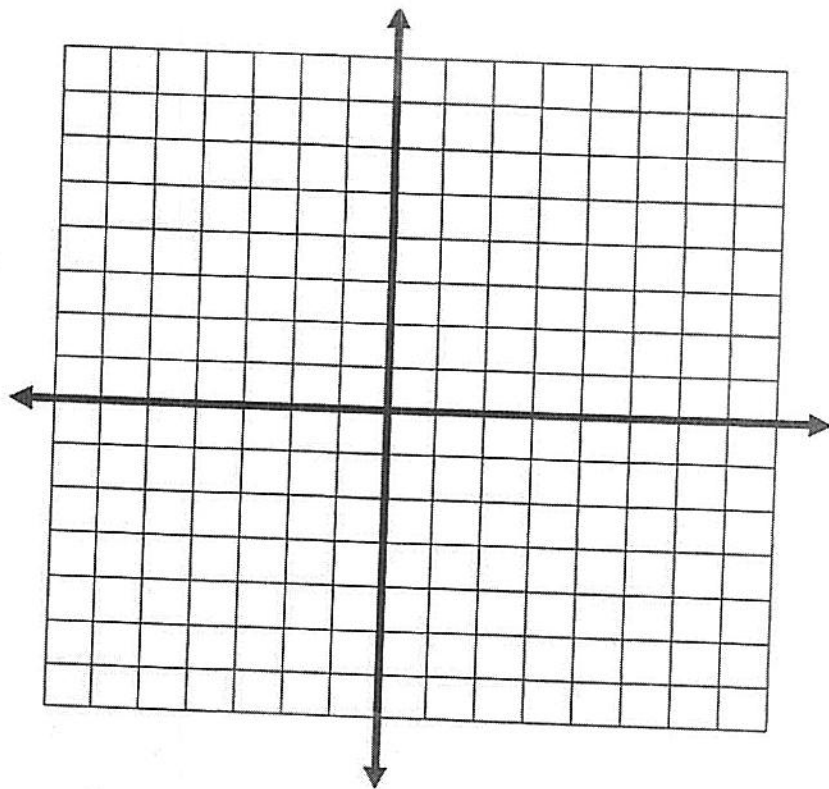
**General Graph for  $y = x^2$**



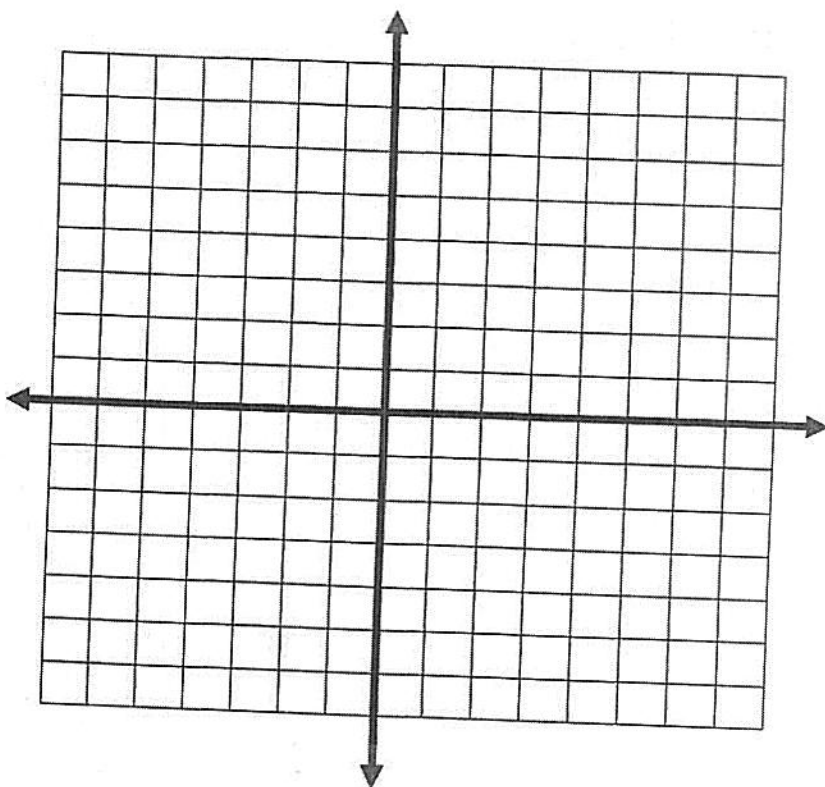
Domain:  
Range:

**Examples:**

1. Given the quadratic function  $f(x) = -x^2 + 6x - 5$ , find the axis of symmetry, vertex,  $x$ - and  $y$ -intercepts and graph it.

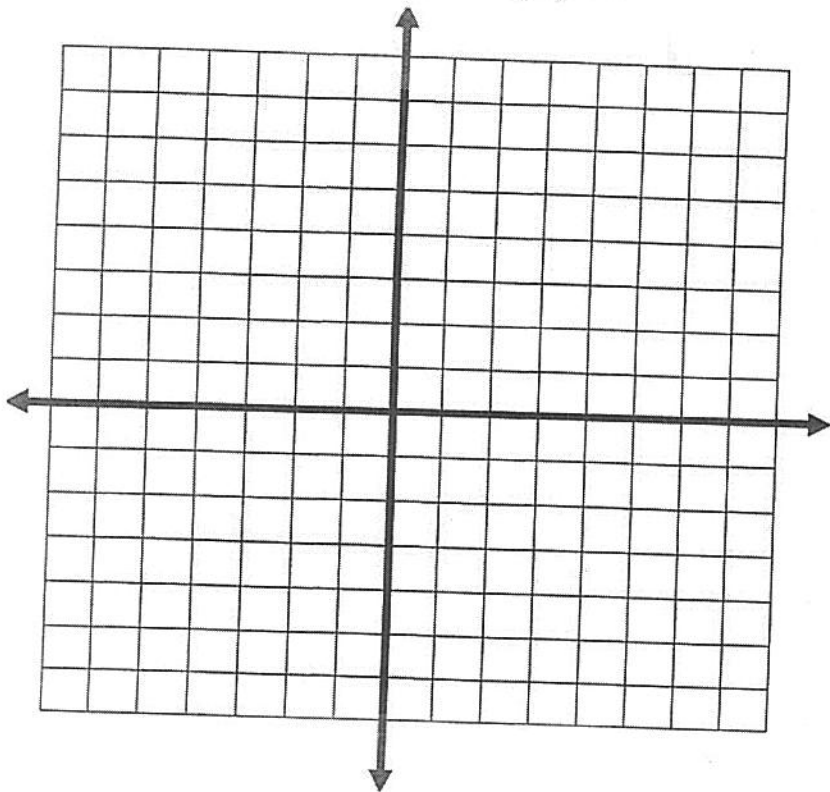


2. Given the quadratic function  $f(x) = (x - 4)^2$ , find the axis of symmetry, vertex,  $x$ - and  $y$ -intercepts and graph it.

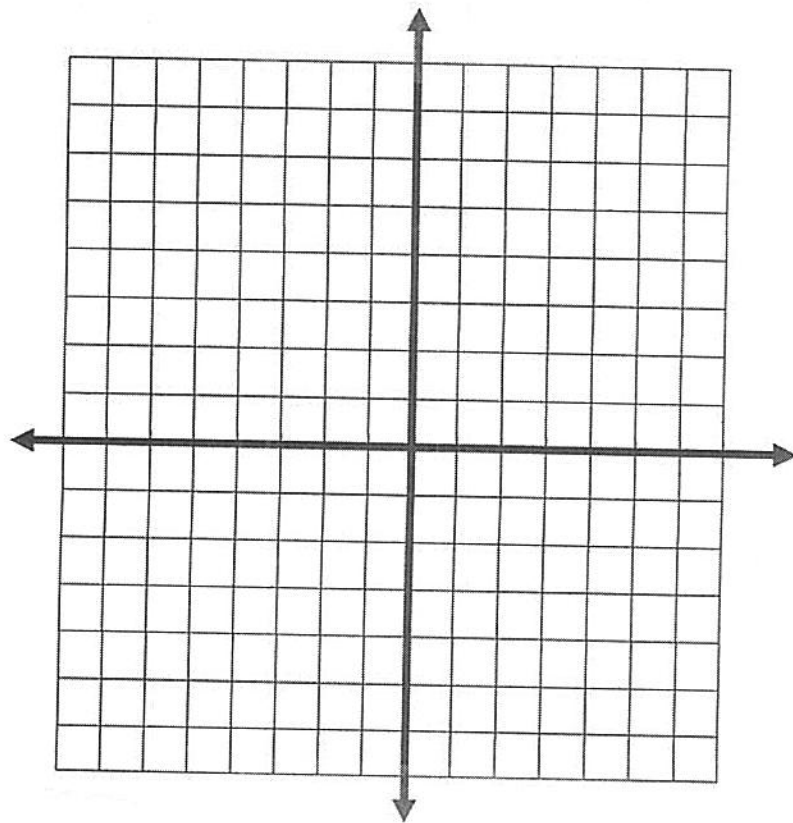


How does the graph in question 2 compare to the general graph of  $y = x^2$ ?

3. Given the quadratic function,  $f(x) = 2x^2 + x - 1$  find the axis of symmetry, vertex,  $x$ - and  $y$ -intercepts and graph it.



4. Given the quadratic function  $f(x) = 2(x-1)^2 + 4$ , find the axis of symmetry, vertex,  $x$ - and  $y$ -intercepts and graph it.



5. Use the information to write the vertex form equation of each parabola

(a)  $y = -x^2 - 14x - 59$

(b)  $y = x^2 - 12x + 46$

(c)  $y = x^2 - 6x + 5$

(d)  $y = x^2 + 16x + 71$

(e)  $y = x^2 - 2x - 5$

(f)  $y = x^2 + 4x$

(g)  $y = 2x^2 + 36x + 170$

(h)  $y = 2x^2 + 12x - 2$

(i)  $y = 2x^2 - 12x - 23$

For each of the following, find the axis of symmetry, vertex,  $x$ - and  $y$ -intercepts and sketch the graph on a separate piece of graph paper.

6.  $y = (x - 5)^2 - 4$

8.  $y = x^2 + 4x + 5$

10.  $y = 4x^2 - 8x + 3$

7.  $f(x) = x^2 + 6x + 5$

9.  $f(x) = -x^2 + 8x$

11.  $y = x^2 - 6x + 13$